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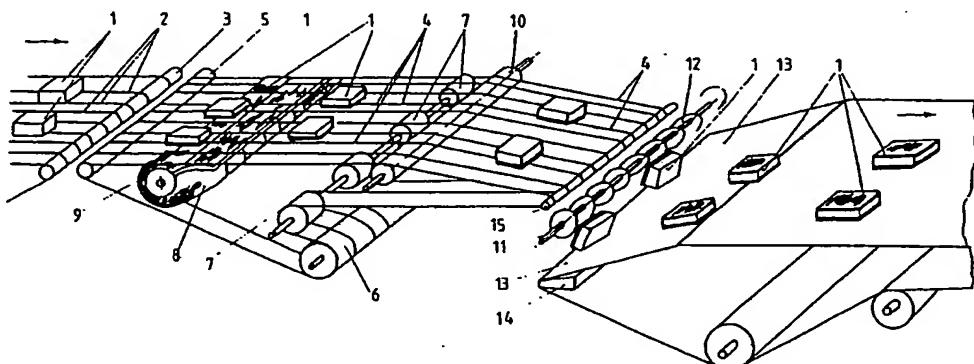
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## (54) Coating apparatus

(57) Apparatus for application of coatings to articles (1) for example confectionery, bakery products and biscuits, comprises a grating conveyor belt (4) which passes over a coating material container (8) and dips into the container so that the articles are provided with a bottom coating. The articles are then transferred to a cooling belt (13) by way of a turning element (11, 12). The outlet of the grating belt (4) and the inlet of the cooling belt (13) are settable in their operating height and inclination relative to each other so that the turning over of the articles between the belts can be controlled and the two belts (4; 13) can travel at the same speed. Belt (13) is set by adjusting guide plate (14) and belt (4) is set by adjusting roller (15) and by adjusting rollers (5, 6, 7 and 10).



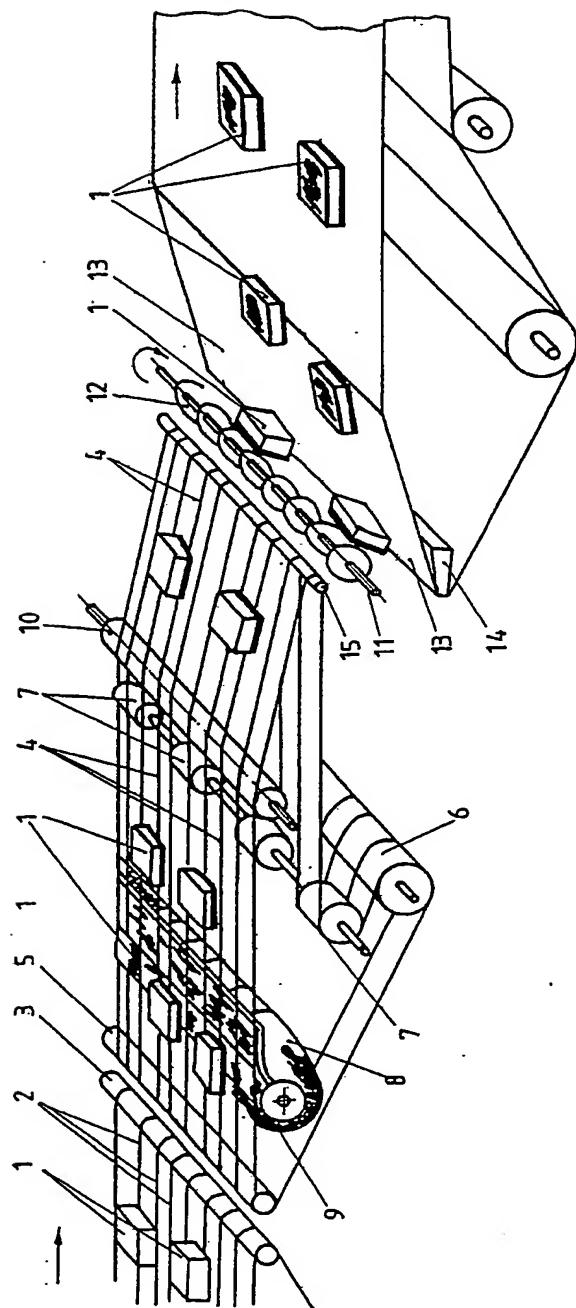
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## SPECIFICATION

## Coating apparatus

5 The present invention relates to apparatus for application of coatings to articles, for example confectionery products, bakery goods, biscuits and so forth to be coated with a liquid solidifiable material such as chocolate or the like.

10 For the coating of articles of the kinds mentioned, it has been the practice to use coating apparatus by which a bottom coating of chocolate or other confectionery mass could be applied to the underneath sides of the articles.

15 In that case, a grating transport belt was passed over a container and conveyed articles into a coating material in the container, the belt then transferring the bottomcoated articles to a cooling belt. Such articles can be

20 transferred directly to the cooling belt so that the chocolate bottom then assumes the surface of the cooling belt, which can be smooth or embossed, or the articles can be turned through 180 degrees by a so-called rocker

25 shaft before transfer to the cooling belt. In such a case, the chocolate coating is disposed uppermost and carries the outlines of the grating transport belt.

The rocker shaft turns in the conveying direction and carries a plurality of plates with a diameter of between 40 and 80 millimetres. Stripper fingers engage between the plates to ensure that chocolate does not build up on the plates. However, the articles are often deposited irregularly, because the turning property of an article depends on a number of things, for example the dimensions and weight of the article, the viscosity of the chocolate, and the operating speed of the apparatus.

40 Moreover, the contact between article and rocker shaft reduces at higher belt speeds, so that either the articles shoot over the rocker shaft without turning or they are not turned sufficiently and fall onto the cooling belt. This

45 can lead to two articles lying one on top of the other. The articles thus lose their longitudinal and transverse orientation, which influences downstream automatic packaging and is a disruptive factor, apart from the fact that

50 articles on top of one another become rejects. For a remedy, the cooling belt speed has been increased by up to 50% in comparison with the speed of the grating belt.

It would be desirable, however, to eliminate 55 the described defects and to create apparatus which may operate in a trouble-free manner and by which it may be possible to consistently turn coated articles without undue change in the alignment of the articles, preferably with deposition of the turned articles on a cooling belt as closely as possible beside one another.

According to the present invention there is 60 provided apparatus for application of coatings to articles, the apparatus comprising a recep-

65 tacle for a solidifiable coating material in liquid state, a first conveyor belt for conveying articles past the receptacle to each receive a coating of such material at a downwardly

70 facing side thereof and a second conveyor belt to receive coated articles from the first conveyor belt and to convey the received articles, the downstream end portion of the conveying run of the first conveyor belt and the

75 upstream end portion of the conveying run of the second conveyor belt being settable in height and inclination relative to each other. The second or cooling belt can be arranged to be pivotable or resettable in height at the

80 outlet of the apparatus. Preferably, the outlet of the first or grating belt and the inlet of the cooling belt can be lowered downwardly so that the angle between the belts is less than 180 degrees. The articles on the grating belt

85 need no longer be turned through an angle of 180 degrees, so that the momentum required for turning can be correspondingly reduced. The longitudinal and transverse alignment of the articles deposited on the cooling belt

90 therefore remains substantially unchanged and the articles can at the same time be deposited relatively close to one another. It is thereby possible to reduce the speed of the cooling belt so that downstream cooling paths, for

95 example cooling tunnels, can be reduced in length. Reductions of more than 50% are possible. The entire apparatus can therefore be set up to occupy less space and substantially more favourable in costs. A turning element

100 can be disposed between the belts and be provided with a separate drive.

An embodiment of the present invention will now be more particularly described by way of example with reference to the accompanying drawing, the single figure of which is a schematic perspective view of apparatus embodying the invention.

Referring now to the drawing, there is shown coating apparatus for providing articles 1, for example plate-shaped biscuits, storables bakery goods or the like, with a chocolate bottom coating. The articles 1 are advanced on transport belts 2 or the like in the direction indicated by the arrow. The articles are then transferred by way of a roller 3 to a grating conveyor belt 4, which runs over rollers 5, 6, 7, 10 and 15. The upper part of the belt 4 dips from above into a horizontally arranged container 8, which is filled with coating mass 9, for example chocolate. The articles 1 are dipped into the mass at their undersides and in this manner provided with a bottom coating.

The downstream end portion—between the 125 rollers 10 and 15—of the conveying run of the belt 4 adjoins an upstream end portion of a cooling conveyor belt 13, between which is disposed a turning element in the form of a shaft 11 carrying plates 12.

130 The guide rollers 5, 6, 7 and 10 for the belt

4 can be settable in their operating height. In addition, the inclination of the downstream end portion of the belt 4 and the upstream end portion of the belt 13 can be set relative to each other. Expediently, a guide plate 14 of the belt 13 and the roller 15 of the belt 4 can be lowered downwardly for this purpose. The angle between the two belts is thereby less than 180 degrees. The articles on the belt 4 therefore run at an angle down to the turning element and are turned by this so that the coating is disposed uppermost, in which case they need be turned only through an angle which is less than 180 degrees. The momentum or the turning impulse which the articles receive in this manner is substantially less than for turning through 180 degrees, so that they substantially maintain their longitudinal and transverse alignment and can be deposited very closely one beside the other on the belt 13. The turning process effectively starts on the belt 4.

The portion of the belt 4 extending beyond the roller 10 thus forms an outlet settable in height. Arranged closely behind this is the shaft 11 with the plates 12, which are mounted on the shaft at a spacing from each other and can be round or star-shaped. It is important that either the shaft 12 or the belts 30 arranged on either side of the shaft are settable in operating height relative to one another.

As already mentioned, it is of particular advantage if the articles 1 can be deposited very closely beside each other on the cooling belt. 35 This can therefore run at the same speed as the grating belt 4, which was not the case in known apparatus. Any adjoining cooling paths, for example cooling tunnels, can be shortened quite appreciably, which entails substantial 40 cost savings. It is also feasible to arrange several turning stations one after the other so that the articles can be provided with different coatings.

#### 45 CLAIMS

1. Apparatus for application of coatings to articles, the apparatus comprising a receptacle for a solidifiable coating material in liquid state, a first conveyor belt for conveying articles past the receptacle to each receive a coating of such material at a downwardly facing side thereof and a second conveyor belt to receive coated articles from the first conveyor belt and to convey the received articles, the downstream end portion of the conveying run of the first conveyor belt and the upstream end portion of the conveying run of the second conveyor belt being settable in height and inclination relative to each other.
2. Apparatus as claimed in claim 1, wherein the downstream end portion of the conveying run of the first conveyor belt extends downwardly towards the respective other belt.
3. Apparatus as claimed in either claim 1 or 65 claim 2, wherein the upstream end portion of

the conveying run of the second conveyor belt extends downwardly towards the respective other belt.

4. Apparatus as claimed in any one of the preceding claims, wherein the downstream end portion of the conveying run of the first conveyor belt and the upstream end portion of the conveying run of the second conveyor belt subtend an angle of less than 180 degrees.
5. Apparatus as claimed in any one of the preceding claims, comprising a rotatable turning element arranged between the downstream end portion of the conveying run of the first conveyor belt and the upstream end portion of the conveying run of the second conveyor belt to cause the coated articles to be turned over during transfer to the second conveyor belt, means being provided for setting the height and the rotational speed of the turning element.
6. Apparatus as claimed in claim 1, wherein the downstream end portion of the conveying run of the first conveyor belt and the upstream end portion of the conveying run of the second conveyor belt are so inclined relative to each other that the articles are transferred from the first conveyor belt to the second conveyor belt by a predetermined limited angular movement inverting the articles.
7. Apparatus substantially as hereinbefore described with reference to the accompanying drawing.

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